REMARKS/ARGUMENTS

Applicant has received the Final Office Action dated August 20, 2009 (hereinafter "Office Action"), which 1) rejected claims 1, 8-13, 18-19, 26-31, 36-37, 44-49, 54-55, 62-67 and 72 as allegedly obvious under 35 U.S.C. § 103(a) over Perlman (U.S. Pat. No. 5,844,902) in view of Shah (U.S. Pat. No. 7,111,105) and further in view of Suzuki (U.S. Pat. App. Pub. No. 2002/0041594); 2) rejected claims 2-7, 20-25, 38-43 and 56-61 as allegedly obvious under 35 U.S.C. § 103(a) over Perlman in view of Shah and Suzuki, and further in view of Soumiya (U.S. Pat. No. 6,671,257); 3) rejected claims 14, 16, 32, 34, 50, 52, 68 and 70 as allegedly obvious under 35 U.S.C. § 103(a) over Perlman in view of Shah and Suzuki, and further in view of Fredericks (U.S. Pat. No. 6,347,334); and 4) rejected claims 15, 33, 51 and 69 as allegedly obvious under 35 U.S.C. § 103(a) over Perlman in view of Shah and Suzuki, and further in view of Lee (U.S. Pat. App. Pub. No. 2003/0099194). Applicant has amended claims 1-3, 5-8, 11-15, 18, 55-57, 59-62 and 65-72, cancelled claims 19-54 and 64, and added new claims 73-106. Based upon the amendments and arguments presented herein, Applicant respectfully submits that all claims are in condition for allowance.

I. The Claim Amendments

Applicants have amended independent claims 1 and 55 to simplify the preambles and remove selected elements. The independent claims have also been amended to recite the information as added to the payload of a frame, to more clearly recite the added information elements, and to refer to the interconnections as being between the traversed switching units. Dependent claims 2-3, 5-7, 11-12, 56-57, 59-61 and 65-67 have been amended to recite receive and/or transmit ports, rather than receiving or transmitting a frame. Dependent claims 8 and 62 have been amended for consistency with their respective independent claims. Dependent claims 11-13 and 65-67 have been amended to recite the types of frames to which the claims respectively apply. Dependent claims 15 and 69 have been amended to simplify the wording of the claim. Dependent claims 18 and 72 have been amended to remove the claim element "and not further transmitting the frame." Dependent claims 68 and 70 have been amended to recite Fibre Channel elements other than the switch. Dependent claims 71 and 72 have been amended to recite

the source and destination relative to the frame rather than relative to the switch. These amendments are all fully supported by the specification and do not introduce any new matter.

II. The Independent Claims

A. Shah Does Not Disclose a Switch

In rejecting independent claims 1 and 55 as allegedly obvious over the cited art, it was stated in the Office Action that,

> Shah discloses *a plurality of switching units coupled to the ports so that a frame traverses multiple switching units in the switch* (Fig.4 ref.601 is a node containing multiple bus bridges – where the node is a switch and the bus bridges contain switching units).

Office Action, Claim Rejections, ¶ 2 at 2.

Thus, the Office Action asserts that I/O node 601 of Shah is a switch that contains multiple switching units. Applicant respectfully traverses this characterization of the cited art, noting that the node taught by Shah is not a switch. More specifically,

> FIG.4 shows the disclosed embodiment of FIG. 2 incorporated into a computer system **600**. The computer system **600** includes CPU nodes **610**, I/O nodes **630**, and switch matrix **620**. CPU nodes **610** include the four nodes **611**, **612**, **613** and **614**. I/O nodes **630** include four I/O nodes **601**, **602**, **603** and **604**. A switch fabric **620** is connected to CPU nodes **610** and to I/O nodes **630**. The embodiment disclose in FIG. 2 is shown in FIG. 4 as I/O node **0**. Like FIG. 2, I/O node **0** contains a parent-bridge **230**. Parent-bridge **230** is attached via child-links **285** to child-bridges **260**. The child-bridges **260**, in turn, are connected via grand-child links **295** to buses **280**. Finally, buses **280** are attached to I/O devices **290**. It is contemplated, although not required, that some or all of the other I/O nodes would adopt a similar architecture shown in detail in I/O node **0**.

Shah, col. 8, lines 38-52.

While Shah does disclose a switch fabric connected to the CPU nodes and the I/O nodes, neither the CPU nodes nor the I/O nodes are ever described as performing any switching functions, such as, e.g., receiving frames at one port from an external source and

directing the frame to another port for transmission to an external destination. Moreover, it is clear from FIG. 4 that the CPU and I/O nodes are *endpoints* within the system shown, as each node only has one connection: the connection to the switch fabric. There is no indication in either FIG. 4 or any other portion of Shah that any of the nodes act as a switch.

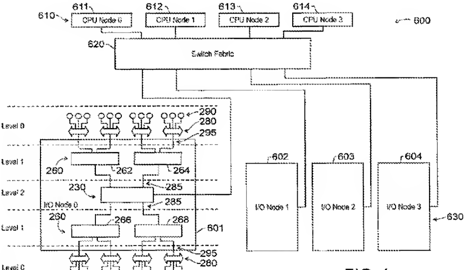

FIG. 4

For at least these reasons, Applicant respectfully submits that none of the cited art teaches or suggests the claimed switch of amended independent claims 1 and 55, and thus respectfully requests withdrawal of the rejections of these claims and all claims that respectively depend upon them.

B. Perlman and Shah Cannot Properly Be Combined

Applicant further notes that,

> If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)

MPEP, § 2143.01-V.

Applicant respectfully submits that the combination of Perlman and Shah would render the inventions taught by both references unsatisfactory for their intended purpose, and thus one of ordinary skill in the art would have no motivation to combine the references.

More specifically, the network bridges taught by Perlman are part of a network of interconnected LANs, as shown in FIG. 1 (reproduced below).

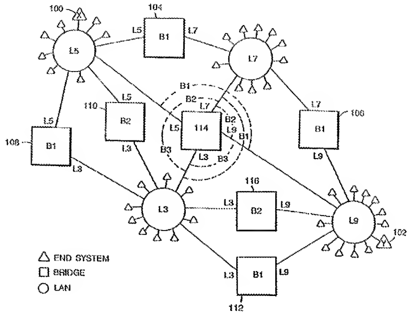

FIG. 1

As with most networks, end devices can communicate with each other through more than one path. As noted by Perlman,

> One complication which the above description does not handle is the possibility of parallel bridges connecting two LANs. Often it is desirable to increase the capacity or reliability of a network by placing multiple bridges between two LANs; for example, bridges **108** and **110** both connect LAN **L5** to LAN **L3**. Under the scheme described above, when bridges **108** and **110** receive a source routed message such as that described above:
>
> **Y|X|L5|L3|L9**
>
> both would transmit the message from LAN **L5** to LAN **L3**. As a result, two copies of the message will be forwarded.
>
> To avoid this possibility, typical LAN/bridge networks also apply "parallel bridge numbers" to each bridge of a set of parallel bridges that connect two LANs. For example,

Perlman, col. 4, lines 19-32.

Perlman then teaches the following as one possible solution to the above-described problem,

> FIG. 1 illustrates a third, preferred scheme. In this scheme, 3+-port bridges are treated as a collection of two-port bridges, one for each connection made by the 3+-port bridge. Thus, each pair of connections made by the 3+-port bridge is assigned a different parallel bridge number. Thus, bridge **114** is assigned parallel bridge number **B3** for the connection that it makes between LANs **L5** and **L3**, but it is assigned parallel bridge number **B2** for the connection that it makes between LANs **L5** and **L7**. In all, bridge **114** connects 6 different pairs of LANs and thus is equivalent to 6 single bridges, and therefore is assigned 6 parallel bridge numbers, one for each connection. (An n-port bridge will make $(n^2-n)/2$ connections and thus will need to store this many parallel bridge numbers.)
>
> Perlman, col. 5, lines 15-28.

The invention taught by Perlman is directed to a specific implementation of this solution:

> In one aspect, the invention features a bridge for simultaneous connection to n LANs, where n is greater than 2. The bridge includes storage for respectively associating the $(n^2-n)/2$ unique pairs of LANs connected by the bridge with $(n^2-n)/2$ parallel bridge numbers. Messages received from a first LAN are forwarded to a second LAN only if the message identifies the second LAN and the parallel bridge number which is associated in the storage with the first and second LANs.
>
> Perlman, col. 1, lines 54-62.

Thus, the invention taught by Perlman addresses how to number bridges in order to address the issues created by parallel paths through network bridges.

The invention taught by Shah, however, addresses issues related to bridging hierarchical busses, not network bridging. More specifically,

> Briefly, the illustrative system comprises a method and architecture for optimizing transaction ordering operations <u>in a hierarchical bridge environment</u>. The architecture includes at least a first bridge (parent-bridge), connected to a second bridge (child-bridge) via a link (child-link), and the child-bridge is connected to a transaction link (grandchild-link), where a parent-bridge has a set of buffers for each child-link to hold incoming transactions. For each child-link, the parent-bridge has at least two TOQs to provide separate transaction ordering for the child-links that communicate transactions from multiple different transaction sources, i.e., multiple grandchild-links.
>
> Shah, col. 2, lines 56-67 (emphasis added).

Shah subsequently notes that the transaction order queues are needed to avoid violating the rules associated with hierarchical busses such as PCI and PCI-X:

> Further, the bus-bridge **139** has a transaction order queues (TOQ) **131** and transaction buffers **186** for each bus-bridge/bus link, such as bus-bridge/bus link **162**. TOQ **131** stores transaction buffer identifiers for certain transactions to ensure that system ordering rules, such as PCI and PCI-X ordering rules, are not violated.

Shah, col. 1, lines 39-46.

Applicant notes that it is well known in the art that in hierarchical busses such as PCI there is only one single data route between any two end devices within a bus hierarchy. All data transfers from one device to another device are each first directed upstream to the root bus, and then back downstream to the target device. In such a hierarchical bus structure parallel paths are not allowed.

From the above it is clear that the network structure required by the invention taught by Perlman is incompatible with the hierarchical bus structure required by the invention taught by Shah. The bridge numbering scheme taught by Perlman is of no use within the bridged bus hierarchy taught by Shah, as the hierarchical bus structure does not allow parallel paths. The combination of Perlman and Shah thus renders the invention of Perlman unsatisfactory for its intended purpose (to enable bridging of networks using network bridges with multiple ports that provide parallel paths between the same networks). Similarly, the TOQ optimization taught by Shah is meaningless within the network structure taught by Perlman, as the bus hierarchy that imposes the need for the TOQs taught by Shah does not exist in the networked environment taught by Perlman. The combination of Perlman and Shah thus also renders the invention of Shah unsatisfactory for its intended purpose (to improve the throughput of bridged hierarchical busses by optimizing the ordering of hierarchical bus transactions).

Applicant thus respectfully submits that one of ordinary skill in the art would not be motivated to combine Perlman and Shah as the combination renders both inventions unsatisfactory for their respective intended purpose. Applicant further respectfully submits that the above-described incompatibility of the two technologies also

demonstrates that Perlman and Shah are non-analogous art. For at least these reasons, Applicant respectfully submits that the combination of Perlman and Shah is improper and therefore respectfully requests withdrawal of the rejections of independent claims 1 and 55, as well all claims that respectively depend upon them.

C. Suzuki Does Not Teach Adding Payload Information

In rejecting independent claims 1 and 55 as allegedly obvious over the cited art, it was further stated in the Office Action that,

> Suzuki discloses *adding information to a frame as it traverses multiple switching units* (Fig.3 and Para.[0039] Each bus bridge includes a switching unit connected between ports A and B. The packet switching unit translates the channel identifier contained in the header and forwards the header-translated multicast packet - where forwarding the header translation is adding information).

Office Action, Claim Rejections, ¶ 2 at 4.

Without conceding the merits of the rejection, Applicant has amended claims 1 and 55 to recite adding the information to the payload of the frame. At least because this is not taught or suggested by any of the cited art, Applicant respectfully submits that independent claims 1 and 55, as well as all claims that respectively depend upon them, are allowable.

III. The Dependent Claims

A. Dependent claims 11-13 and 65-67

It was stated in the Office Action that,

> A header is attached to the message indicating the source and destination address (Perlman Col.3 lines 31-33 and Col.5 lines 56-62 the bridges modifies the message by attaching an indication of the LAN number and the bridge number through which the message has passed, as well as any other desired information and Fig.2 ref.126 – modify message by attaching an indication of the LAN # and bridge # and any other desired information). The above disclosure shows other types of information that

> can entered into an explorer packet. The messages are also related to the explorer messages and "normal routing rules" are used (Col.5 lines 29-54 the messages are used to route packets and the explorer messages are used to discover the routes. Based on the discovered routes, a route and selected and used.). Perlman's disclosure of routing rules reads on the applicants limitation of "normal routing rules." The routing rules for the explorer messages are "normal routing rules" for the explorer messages.

Office Action, Response to Arguments, § 7 at 13

Without conceding the merits of the rejection, Applicant has amended claims 11, 13, 65 and 67 to each recite that the routing rules used are "normal routing rules used for frames not having information added to the payload." Claims 12 and 66 have been similarly amended for clarity and consistency to recite "source routing rules used for frames having information added to the payload of the frame." Applicant respectfully submits that these elements are not taught or suggested by any of the cited art, and thus respectfully submits that amended dependent claims 11-13 and 65-67 are all allowable.

B. Dependent claims 14 and 68

In sustaining the rejection of dependent claims 14 and 68 as allegedly obvious over the cited art, it was stated in the Office Action that,

> In the remarks, Applicant contends Frederick does not mention anything about retrieving the true destination address from the frame payload.
>
> The Examiner respectfully disagrees. Frederick does mention retrieving the "true destination address" from the frame payload (Col.6 lines 29-31 "the RNID ELS message is sent to the Fabric Controller at the address hex "FFFFFD" as is well known" and Table 1 and Col.5 lines 45-46 "The first word in the payload specifies the Command Code" and Col.5 lines 9-10 the payload of the accept message includes node identification data). Table 1 shows the destination ID that is retrieved from the payload and Col.5 lines 9-10 further state the payload contains address information.

Office Action, Response to Arguments, § 7 at 14-15.

Applicant respectfully traverses this characterization of the cited art, noting that the cited art does not teach or suggest retrieving a true destination address from the payload of the same frame that includes the destination address, as required by the claims.

Applicant notes that the exchange taught by Frederick is a RNID ELS message sent by a first device to a second device to request its ID, to which the second device replies with an accept message that includes node identification data. This is not what is required by the claims. Instead, the claims require that the frame be destination addressed to a well known address and that the fabric manager of the switch comprising the frame be configured to determine a true destination address by retrieving data from the payload of the same one frame recited in the claim. At least because Frederick does not teach or suggest retrieving a true destination address from the same frame that is destination addressed to a well known address, Applicant respectfully submits that dependent claims 14 and 68 are allowable.

Applicant further notes that the Perlman explorer messages are specifically addressed to the desired end point. To change them to being addressed to a well known address would destroy the fundamental operation of the Perlman explorer message, thus rendering the invention taught by Perlman unsatisfactory for its intended purpose when combined with Frederick. As already noted, there is no motivation to combine two references if the combination renders either reference unsatisfactory for its intended purpose. *See* MPEP 2143.01-V. For at least these reasons, Applicant respectfully submits that the rejections of claims 14 and 68 are improper, and respectfully requests withdrawal of the rejections.

IV. The New Claims

Applicant has added new claims 73-106, which include limitations similar to those of the remaining pending claims. Applicant thus respectfully submits that these claims are also allowable for the same reasons presented above.

V. Conclusion

Applicants respectfully request reconsideration and that a timely Notice of Allowance be issued in this case. Applicants believe that no extensions of time or fees

are required, beyond those that may otherwise be provided in documents accompanying this response. Nonetheless, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fees required (including fees for net addition of claims) are hereby authorized to be charged to Wong Cabello's Deposit Account No. 50-1922, referencing docket number 112-0151US.

Respectfully submitted,

/Roberto de León/

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